13 YEARS OF CHANGES IN THE EXTENT AND PHYSIOGNOMY OF MANGROVES AFTER SHRIMP FARMING ABANDONMENT, BALI, INDONESIA

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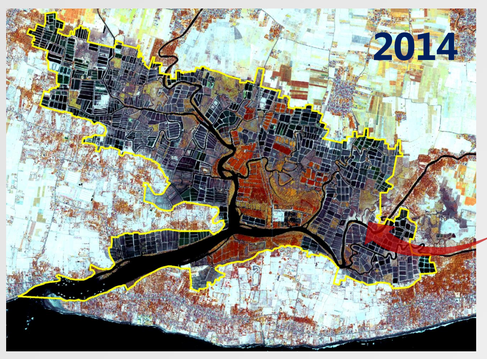
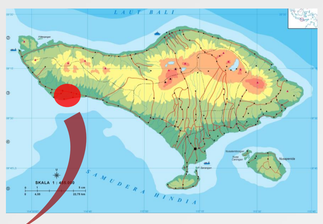
INDESO PROJECT
http://www.indeso.web.id

OBJECTIVES

Analysing changes in surface extents and physiognomy of planted and natural mangroves in an estuary submitted to aquaculture, man-made mangrove plantations and natural recovery processes

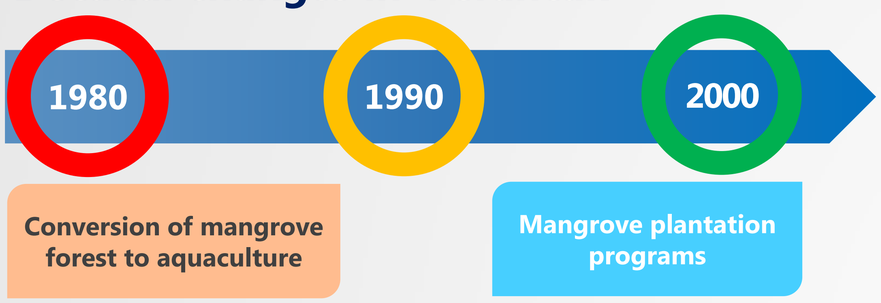
PERANCAK ESTUARY (S8.3916°; E114.628°)





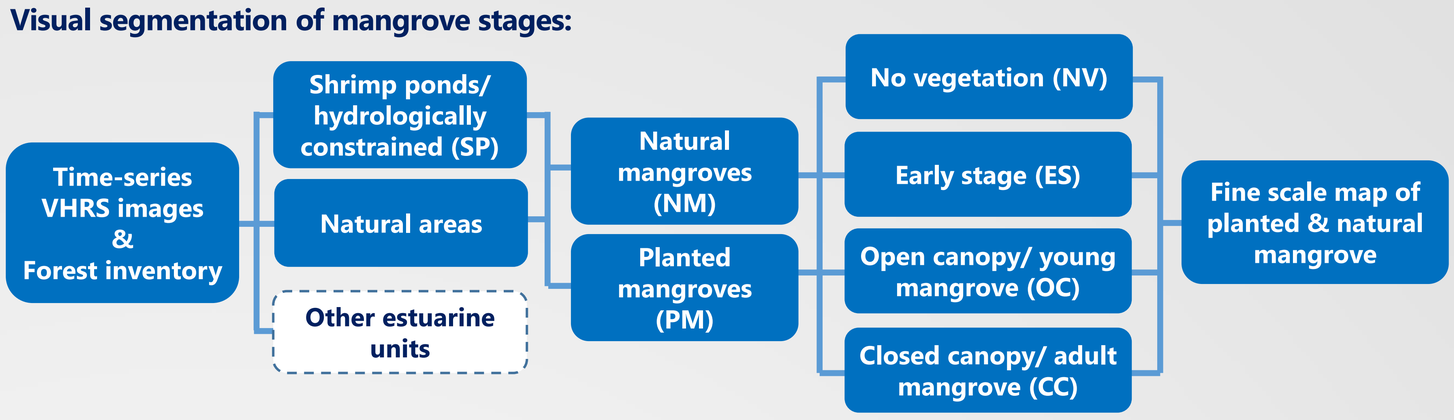
- Estuary area : ~ 7 km²
- Rivers and artificial channels : ~15%
- 4.2 km² (or 69%) of the estuary are covered by 1399 shrimp ponds

Decadal changes in Perancak



METHODS

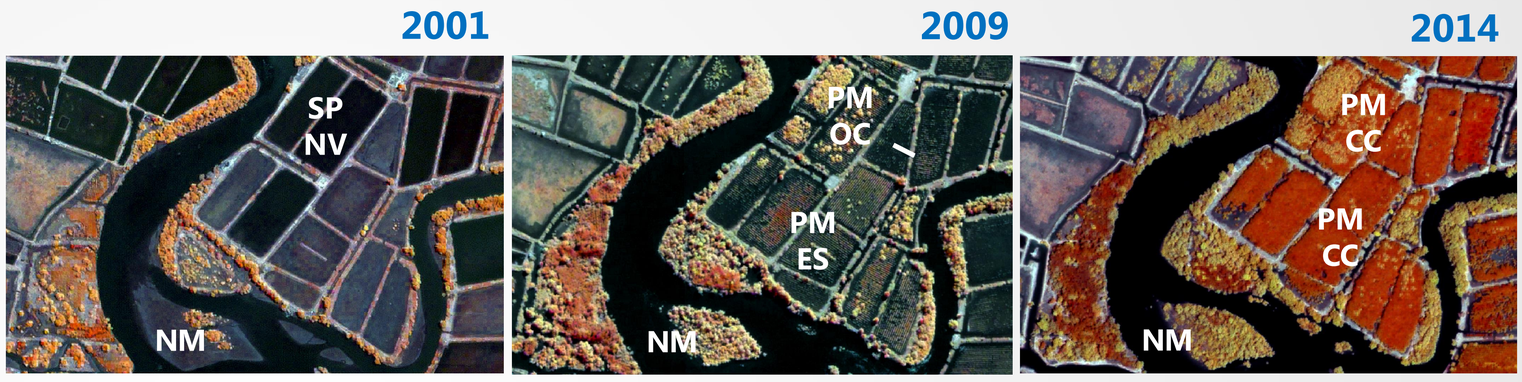
Visual segmentation of mangrove stages:



List of images acquired:

Satellite	Date	Satellite	Date
Ikonos-2	12-Oct-01	GeoEye-1	01-Oct-10
	09-Mar-02	WorldView-2	30-Jun-11
	27-Jun-03		23-Oct-12
QuickBird-2	22-Sep-07		01-May-13
	19-Jul-08		26-Mar-14
	09-Jul-09		

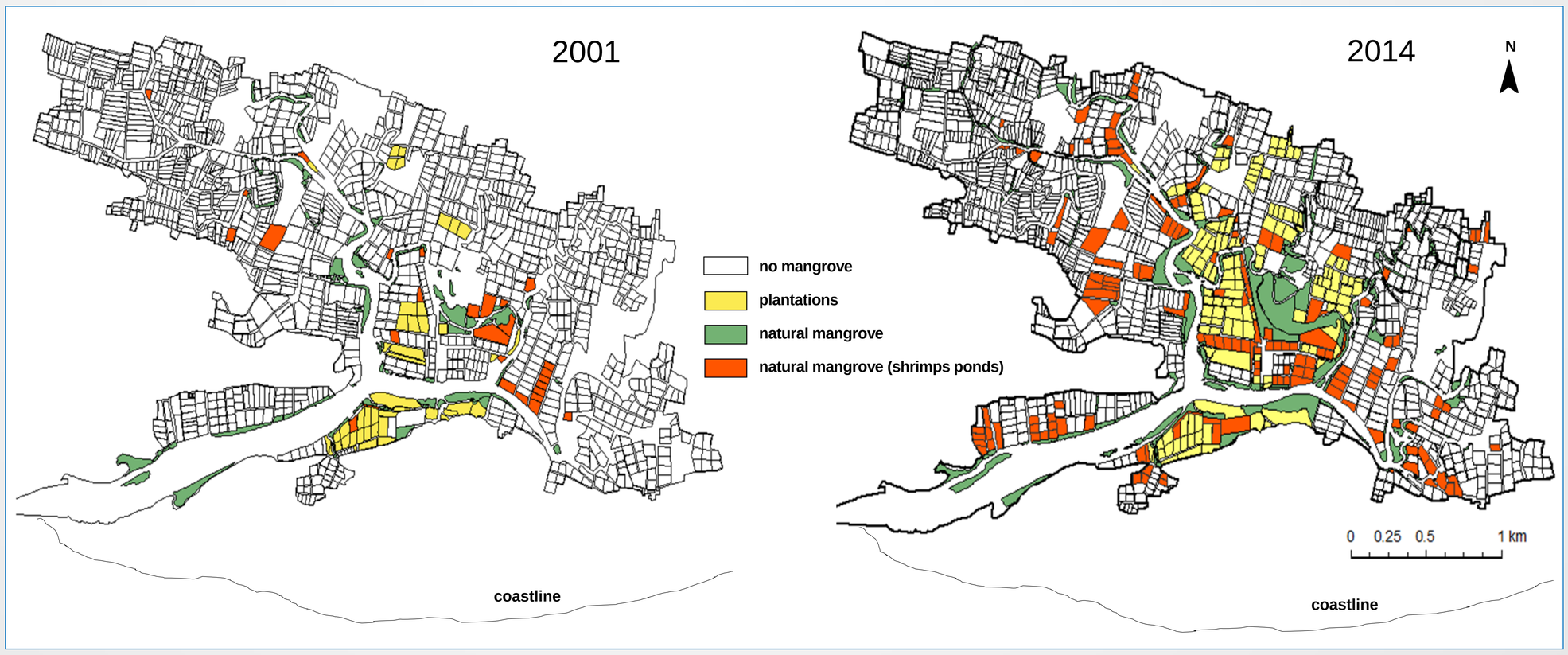
Panchromatic channels have the finest spatial resolution i.e. 0.5 m for Quickbird-2 and WorldView-2, also 1 m for Ikonos-2 images whereas other channels are provided at 2 m and 4 m.



Images extracted (500m x 300m) over typical areas in Perancak estuary

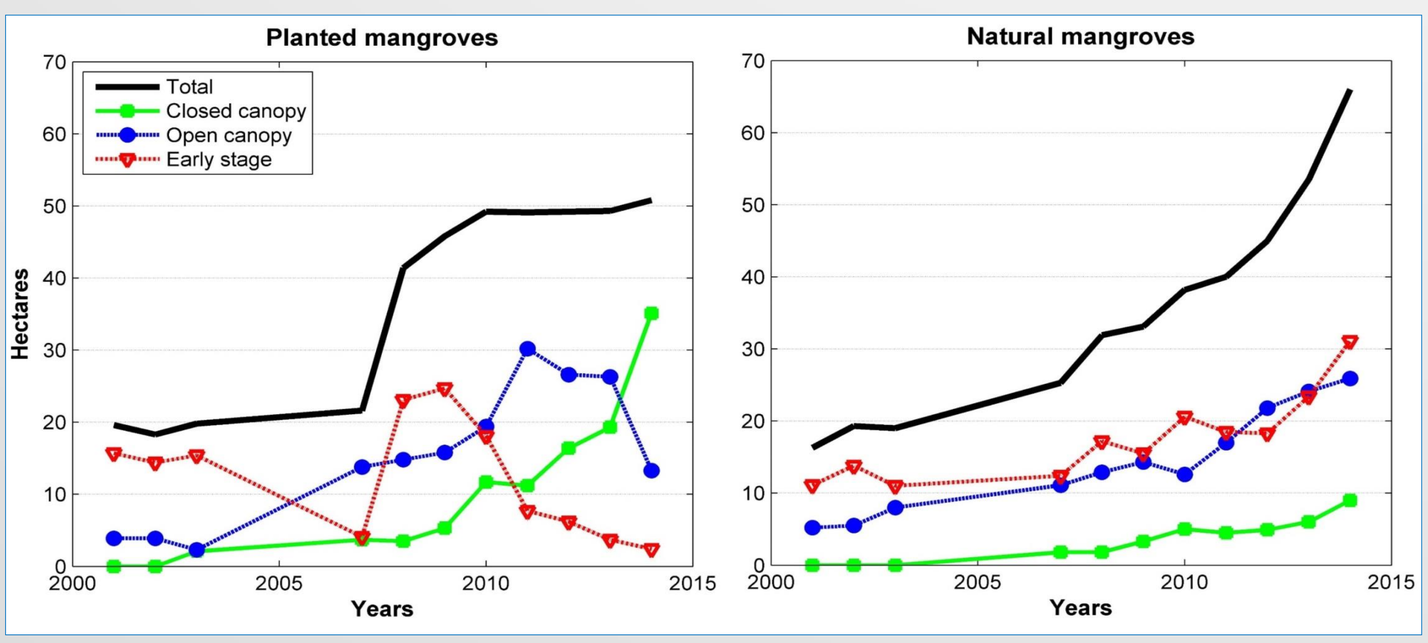
RESULTS

- The Perancak estuary is greening



Fine scale maps of mangrove cover changes between 2001 (left) and 2014 (right). Natural mangroves growing inside shrimp ponds (red) are discriminated from vegetation growing outside shrimp ponds (green).

- Expansion rates of planted are lower than natural mangroves



- The mean rates of expansion for plantation (0.8 ha/year) are lower than natural mangroves (0.9 ha/year).
- Age of plantation and forest growth can be monitored.

CONCLUSION

- Very high resolution satellite images allow a careful monitoring of mangrove changes in the perspective of Integrated Coastal Zone Management.
- Planted mangroves can be discriminated from natural mangroves.
- Extension and forest growth can be monitored.

This work is part of and funded by the INDESO project (2013-2017) led by Balitbang Kelautan dan Perikanan (Ministry of Marine Affairs and Fisheries, Indonesia).

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